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Route To:

Subject: Insect and Disease Conditions in Silvicultural Certification Stand (elritord)

To: District Ranger, El Rito Ranger District, Attn: Dave Lawrence

This letter provides a summary of insect and disease conditions in your silvicultural certification stand, based on our walk-through examination on April 28. Management implications of various silvicultural strategies are also discussed.

This 80 acre stand lies on the northern edge of the Vallecitos Sustained Yield Unit, in the current Ensenada planning area. This is a high elevation (8700') ponderosa pine stand with significant amounts of white fir (> five percent) and a minor amount of Douglas fir (< two percent) included in the overstory. The pine is predominantly single-storied, with 90 to 100 year-old dominant and codominant trees. Site quality is good, with an estimated site index of 80. Most of the existing young regeneration is white fir. Several small aspen clones are intermixed with the conifers, especially in the northern portion of the unit. Basal areas range from 90 to 150+ throughout most of the area, averaging about 130 square feet. The last entry, which included both commercial and precommercial thinning, occurred around 1970.

Insect and disease activity. The most significant and recent insect activity observed was that of the fir-engraver beetle, (*Scolytus ventralis*), which has killed up to one-third of the overstory white fir in the past two years. Similar activity occurred elsewhere in New Mexico in 2003 and 2004. Western pine beetle (*Dendroctonus brevicomis*) galleries were observed in scattered dead ponderosa pines killed since about year 2000. Overall, despite dense stand conditions and prolonged drought, probably less than two percent of the pines have died here in recent years. One sizable group-kill located in a dwarf mistletoe infection center included about 20 trees; most of these had already fallen (breaking at or near the base). Adult western pine beetles parasitized by mites were collected from a tree attacked and killed in 2004.

The white fir and Douglas-fir have experienced some western spruce budworm damage in past years (as evidenced by dead tops on occasional trees of all size classes); however, the severity of outbreaks in this particular area have probably been limited by the high proportion of pine. A very minor amount of broom rust (*Melampsorella caryophyllacearum*) was observed on the white fir.

Both *Armillaria* and annosus (*Heterobasidion annosum*) root disease fungi were common on older stumps; their significance as pathogens (disease-causing agents) in this stand is uncertain since both these fungi persist as saprophytes on dead woody material. *Armillaria* mycelial fans and/or rhyzomorphs (shoestrings) were also detected at the base of a few of the recently killed white firs and on one older dead ponderosa pine we examined, suggesting that they could be influencing tree mortality to some extent.

Ponderosa pine dwarf mistletoe (*Arceuthobium vaginatum* subsp. *cryptopodum*) is the primary pathogen in this stand, occurring in sizable pockets throughout. Our walkthrough indicated a greater incidence of this disease (probably in excess of 30 percent of the area) than detected in a recent stand exam.

Management implications. Silvicultural treatments (thinnings) that significantly reduce basal areas here should, by improving tree vigor, reduce future susceptibility to bark beetle attack. Reductions to around 60 to 80 ft^2 would seem appropriate in this stand. Note that *Ips* engraver beetles often breed in fresh pine thinning slash and sometimes emerge and attack standing trees. Thinning between mid-July and mid-December minimizes the potential for *Ips* outbreaks.

Root disease incidence can increase after thinning, because the stumps (and attached dead roots systems) serve as a "food base" for these fungi. Limited research suggests that only larger (> 16" stumps) have potential to significantly increase disease spread. Potential increases in root disease following thinning may well be "offset" by overall increases in growth and vigor in most stands in the Southwest.

Thinning (as suggested above for reducing bark beetle hazard) can significantly reduce stand dwarf mistletoe infection levels (stand DMR), if careful attention is given to selection and marking within infected areas. However, opening up a stand inevitably stimulates the remaining mistletoe, resulting in only temporary disease reduction. On the other hand, release of the best available uninfected and lightly infected trees can result in significantly increased growth (for at least 10 to 20 years) within most infected areas. It can also lead to development of larger infected trees, which, among other things, may improve habitat for some species (particularly birds and squirrels).

In recent years the group selection method has often been used for treatment of dwarf mistletoe-infected stands, because the strategy fits within an uneven-age management scenario. Because of the usual patchy distribution of the disease, this method can be used (at least in theory) to remove entire infection centers. Depending on how much of the infected acreage is "cut out," stand DMR can be greatly lowered. However, in most cases the result of group selection has been small openings at least partially surrounded by mistletoe, a condition very favorable for the disease over the long-term. Moreover, this strategy often represents a significant sacrifice of accumulated growth.

A group selection strategy focusing on mistletoe could have a negative impact on wildlife habitat, since it could easily result in removal of a high proportion of the larger infected trees from an area. Because of this, as well as the shortcomings described above, it may be reasonable, at least in practice, to limit the total area included in groups to no more than about half of the infected acreage in a stand. The remaining infected acreage might be treated under a "crop tree selection" strategy, at least in areas where the disease is not too severe. Prescribed burning would potentially provide an additional reducing effect on the mistletoe, as well as others benefits.

Given that the majority of the existing young regeneration here is white fir, it can be expected that the stand will move toward mixed conifer type without intervention. Pest management implications of this conversion include increases in the severity of spruce budworm outbreaks and probable increases in root disease.

Please contact me if you have additional questions or concerns about your prescription for this stand.

/s/ David A. Conklin
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cc: Debra Allen-Reid, Regis J Cassidy, MaryLou Fairweather, David E Lawrence